

STORING DATA RELATING TO TELEVISION VIEWING

According to the present invention, there is provided apparatus comprising a combination of transmission means and storage means, the transmission means comprising:

(a) means for accepting data from people monitoring means which produces information relating to the number of people watching a television set and/or television channel detection means of a television viewing monitoring system; and

(b) means for transmitting such data to the storage means, the storage means comprising a semiconductor data storage module which is removable from the apparatus.

For a better understanding of the present invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 is a block diagram of a television monitoring system;

FIG. 2 is a block diagram of a television channel detection unit;

FIG. 3 shows a practical embodiment of part of the detection unit shown in FIG. 2;

FIGS. 4a and 4b show a practical embodiment of another part of the detection unit shown in FIG. 2;

FIG. 5 is a block diagram of a people monitoring unit;

FIGS. 6A, 6B and 6C, when joined as indicated, show a practical embodiment of the people monitoring unit of FIG. 5;

FIG. 7 shows an embodiment of a remote handset for use in the people monitoring unit of FIG. 5;

FIG. 8 is a block diagram of an embodiment of a mains transmission unit;

FIG. 9 shows graphs 9a to 9f illustrating the operation of the mains transmission unit of FIG. 8;

FIG. 10 is a block diagram of a meter which records information from a mains supply line, and transmits the information at night by way of a public telephone network;

FIG. 11 is a major side view of a removable semiconductor data module, FIGS. 12 and 13 being views in the direction of arrows A and B in FIG. 11 respectively;

FIG. 14 is a block diagram of circuitry in the module; and

FIG. 15 is a block diagram of a meter for use with the module.

FIG. 1 shows a block diagram of a television monitoring system comprising a television channel detection unit 1; a people monitoring unit 2; a mains transmission unit 3; and a household receiving unit 4.

The television channel detection unit 1 will now be described in detail with reference to FIGS. 2 to 4.

The unit 1 is designed to sense ultra or very high frequency radiation from a tuner 10 in a domestic television receiver 12 and so determine if the channel to which the television receiver is tuned is one of a multiplicity of channels which have been preset into the detection unit 1. A different binary coded word is produced for each channel detected. A pick-up probe 14 is in the vicinity of a local oscillator of the television receiver 12 to be monitored. The inductively coupled signal is fed into a modified variable capacitance diode tuned tuner 16. A standard television tuner could be used, provided that the frequency range is extended to

cover the range of the local oscillator frequency radiated from the TV receiver. The signal from the tuned tuner is amplified using a conventional I.F. amplifier and surface acoustic wave (S.A.W.) filter 18, for example one made by Mullard or Plessey. A d.c. voltage is produced from a detector 20 when the tuner 16 is tuned to the radiated frequency of the TV receiver 12. The unit 1 is programmed to look for preset frequencies by applying different tuning voltages to variable capacitance diodes within the tuner 16. The output of the detector 20 is connected to a low frequency oscillator 21 and an analogue tuning voltage is generated from a binary number using digital to analogue conversion. Binary numbers are stored in a non-volatile store memory chip 24 and each number is addressed in sequence from an address counter 25. The output of the memory 24 is connected to a digital to pulse width converter 22. The output mark to space ratio of the converter is therefore a function of the addressed binary number. The resulting repetitive pulse train is averaged in an integrating amplifier 26 to produce a d.c. tuning voltage which is proportional to the stored binary number. The tuner 16 can therefore be tuned by varying the binary number in the memory 24.

To set up the detection unit to receive different frequencies, an external plug-in unit is used. This external unit enables a particular store address to be selected and the memory 24 contents to be incremented or decremented to tune to the required frequency. The procedure is repeated for all the required frequencies.

In operation, the memory 24 is addressed in sequence from the address counter 25 until a voltage is detected. The address counter 25 is then halted and the tuner 16 is locked to the detected frequency. The binary store address number is used to identify the detected television channel number.

To preserve the memory 24 contents when power to the detection unit is switched off, either a battery powered random access memory (RAM) or an electrically alterable read only memory (EAROM) can be used. The address numbers that represent the detected television channels are outputted to the mains transmission unit 3.

FIG. 3 shows a practical implementation of the tuner 16 (by way of example one made by Thomson CSF of type MTS 200) and the amplifier and S.A.W. filter 18 (by way of example one of type SW153A) and detector 20, and a practical implementation of another part of the detection unit 1 is shown in FIGS. 4a and 4b. The function of the address counter 25 and digital to pulse width converter 22 is achieved in one integrated circuit IC2 of type AV-3-8211 made by General Instruments. The memory 24 is an electrically alterable read only memory (EAROM) type ER1400 IC1 and the integrating amplifier is designed around integrated circuit IC3. The integrated circuit IC2 also provides band switching information for tuner 16 to have multiband operation, tuner 16 normally being in a condition for Band A operation unless +12 volts is applied to either of the lines marked Band UHF and Band B for it to be set to the corresponding one of these conditions.

Advantages of the above-described unit 1 are that only known required frequencies are looked for; and there is no direct electrically conductive connection between the unit and the television set.

FIGS. 5 to 7 illustrate an embodiment of the people monitoring unit 2. In order to monitor the viewing habits of people within a particular room, a push-button